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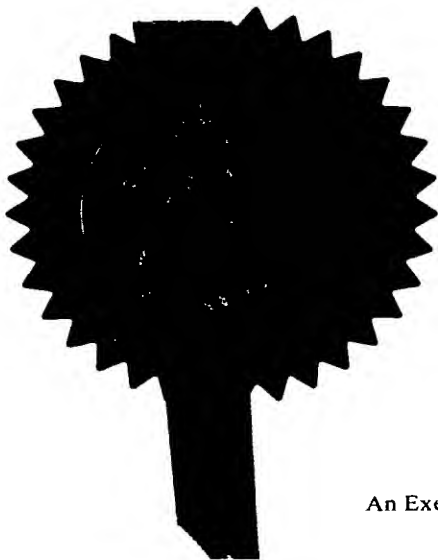
I also certify that the attached copy of the request for grant of a Patent (Form 1/77) bears an amendment, effected by this office, following a request by the applicant and agreed to by the Comptroller-General.

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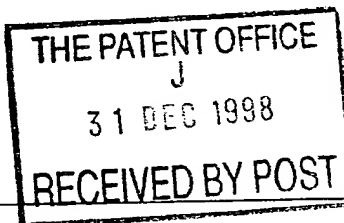
Signed

Andrew Gensley

Dated 14 February 2000

Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)



The Patent Office

Cardiff Road
Newport
Gwent NP9 1RH

1. Your reference

PAS 01

2. Patent application number

(The Patent Office will fill in this p

9828820.2

31DEC98 E415062-1 C47971
P01/7700 0.00 - 9828820.2

3. Full name, address and postcode of the or of each applicant (underline all surnames)

MR S. M. PRESTON, 07578545001
14, KIRK BRAE,
KINKARDINE, ALOA FK10 4PX.

Patents ADP number (if you know it)

MR C. M. HALL,
PARKHILL HOUSE.

If the applicant is a corporate body, give the country/state of its incorporation

DALEY, AYLESFIRE KA24 5BL 0757855200

4. Title of the invention

IN PROCESS METHOD FOR CONTROLLED STRETCHING
OF RECTANGULAR VACUUM FORMABLE SHEET
MATERIAL

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

~~PRESTON A~~
~~4, NORTH~~
~~KINKARDINE~~

Kennedy & Co
Floor 4, Queens House
29 St Vincent Place
GLASGOW
G1 2DT

15/17

Patents ADP number (if you know it)

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

NOT APPLICABLE

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(day / month / year)

NOT APPLICABLE

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

NO

- a) any applicant named in part 3 is not an inventor, or
 - b) there is an inventor who is not named as an applicant, or
 - c) any named applicant is a corporate body.
- See note (d))

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form.
Do not count copies of the same document

Continuation sheets of this form

THREE

Description

HISTORICAL DEVELOPMENT
INNOVATIVE DESCRIPTION

Claim(s)

CLAIM FOR GRANT OF PATENT

Abstract

Drawing(s)

REF ST2000
PARTS DEFINITION APPENDIX

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

NOT APPLICABLE

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature

John Hall
John Hall

Date 21/12/98

12. Name and daytime telephone number of person to contact in the United Kingdom

MR I PRESTON 01259 730270
MR G. HALL 01294 822591.

Warning

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Notes

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- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- If you have answered 'Yes' Patents Form 7/77 will need to be filed.
- Once you have filled in the form you must remember to sign and date it.
- For details of the fee and ways to pay please contact the Patent Office.

DUPLICATE

HISTORICAL DEVELOPMENT.

CELL CAST ACRYLIC SHEET HAS BEEN USED FOR PRODUCING SANITARYWARE PRODUCTS SINCE THE MIDDLE SIXTIES. VACUUM FORMING IS THE ESTABLISHED METHOD FOR CREATING THE MOULD REPLICAS.

UNTIL RECENTLY, THERMOFORMING MACHINERY AND SPECIAL PURPOSE DESIGNED EQUIPMENT HAD A TOP AND BOTTOM FRAME BETWEEN WHICH THE ACRYLIC SHEET WAS CLAMPED. THIS ARRANGEMENT REQUIRED A WIDE MARGIN OF ACRYLIC MATERIAL BETWEEN THE CLAMPING FRAMES, WHICH IS COSTLY WASTE.

DURING 1996 WE INTRODUCED VACUUM FORMING MACHINES WITH INDIVIDUAL PAIRS OF CLAMP BARS WHICH WERE INFINITELY ADJUSTABLE TO SUIT ALL MOULDS WITHIN THE MACHINE RANGE. THIS DESIGN ELIMINATED THE NEED FOR CHANGEING TOOLING TO SUIT EACH MOULD SIZE, SAVING VALUABLE PRODUCTION DOWNTIME.

ACRYLIC SHEET REPRESENTS APPROXIMATELY 70% OF A MANUFACTURER'S FINAL PRODUCT COST. THE ECONOMIC PURCHASING PRACTICE, COMBINED WITH THE WIDE PRODUCT RANGE IS REFLECTED IN LARGE, VARIED SHEET STOCK.

WE HAVE IDENTIFIED A DEVELOPMENT, PARTICULARLY SUITED TO OUR CURRENT DESIGN WHICH WILL RATIONALISE MANUFACTURER'S STOCK AND VIRTUALLY ELIMINATE THE SHEET PRODUCER'S SCRAP.

A RECTANGULAR SHEET IS CLAMPED AROUND IT'S ENTIRE PERIMETER HEATED TO THE MATERIAL FORMING TEMPERATURE. THE CLAMP BAR ARRANGEMENT PROVIDES ONE FIXED CORNER. ATTEMPTS TO STRETCH THE MATERIAL WITH THE PRESENT DESIGN HAVE MET WITH LIMITED SUCCESS IN ONE DIRECTION ONLY.

THE OBJECTIVE IS TO PROVIDE THE CAPABILITY FOR STRETCHING A CONVENIENT BASE SIZE SHEET IN 'X' AND 'Y' DIRECTIONS TO COVER THE FULL HIGH VOLUME PRODUCT RANGE, THUS ACHIEVING THE ABOVE SAVINGS AND INCREASE THE MANUFACTURER'S YIELD BY 25-30%.

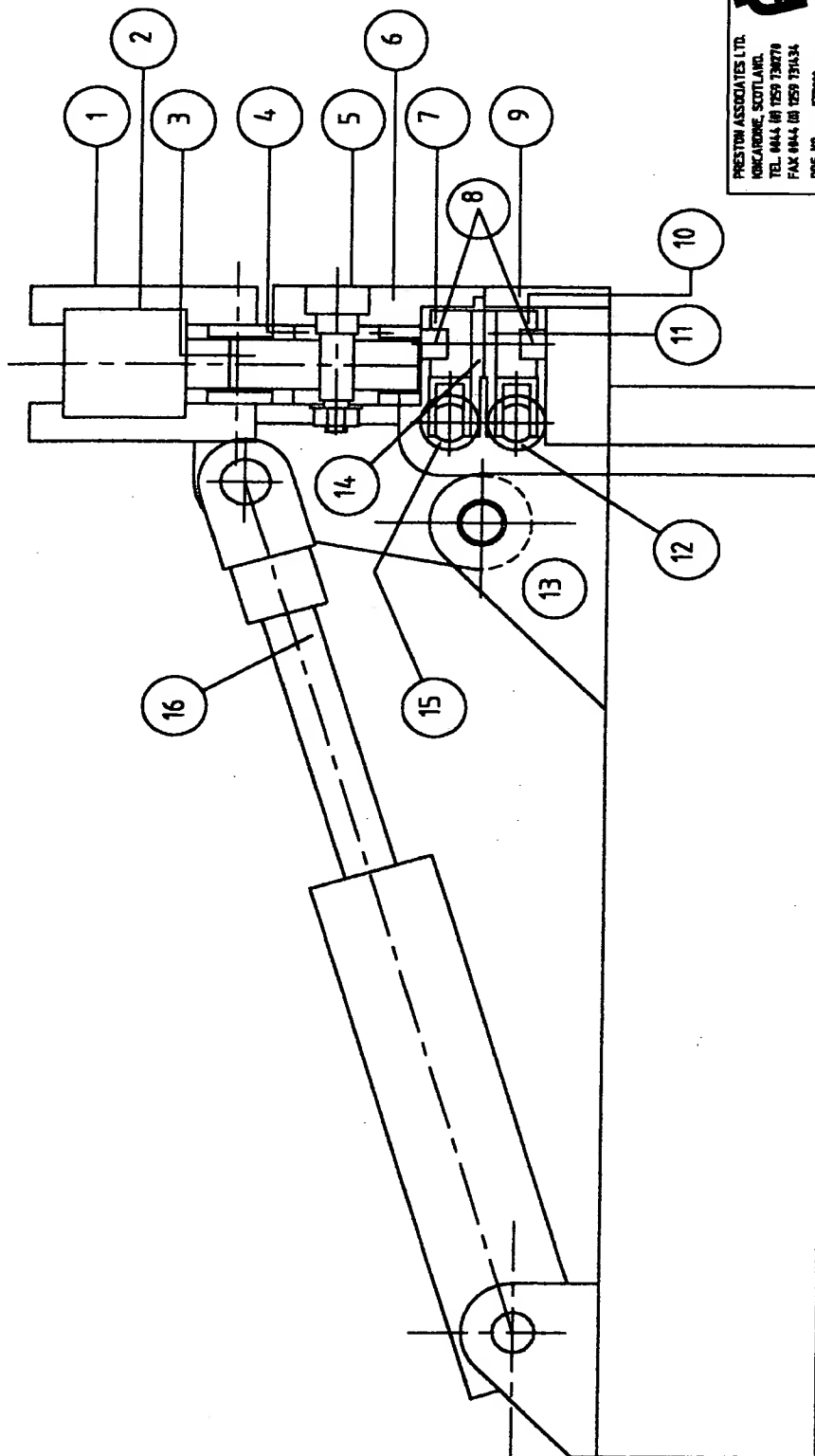
THE INVENTION.


THE ACRYLIC SHEET, DURING THE FORMING CYCLE IS COOLING RAPIDLY AND CONTRACTING.

PART DESCRIPTION SKETCH STR000.

- 1...MAIN CLAMP CYLINDER LOCATION PLATE**
- 2...MAIN CLAMP CYLINDER**
- 3...THRUST PIN**
- 4...CROSS BUSH**
- 5...CROSS PIN**
- 6...TOP CLAMP BLADE**
- 7...SECONDARY CLAMP CARRIAGE**
- 8...CARRIAGE RAILS**
- 9...LOWER CLAMP BLADE**
- 10..SECONDARY CLAMP CARRIAGE**
- 11..LOWER SECONDARY CLAMP PLATE**
- 12..LOWER RETURN ACTUATOR**
- 13..SUPPORT ASSEMBLY**
- 14..TOP SECONDARY CLAMP PLATE**
- 15..TOP RETURN ACTUATOR**
- 16..ROTATION ACTUATOR.**

THE INVENTION'S CLAIM IS TO HAVE ESTABLISHED A RELIABLE METHOD FOR STRETCHING RECTANGULAR VACUUM FORMABLE SHEET MATERIAL IN TWO DIRECTIONS USING SIDE RESTRAINTS WHICH BY DESIGN MOVE WITH THE STRETCHED MATERIAL BY A PROPORTIONAL PREDETERMINED LENGTH, THUS ENSURING UNIFORMITY OF MATERIAL THICKNESS.




PRESTON ASSOCIATES LTD.
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 DRG NO. 877000
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 DATE NOVEMBER 1990
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